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Lawrence P Kessler
NexPress Solutions LLC
Patent Department
1447 St Paul Street
Rochester, NY 14653-7001

EXAMINER	
THOMPSON, JAMES A	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/629,696	NG ET AL.
	Examiner	Art Unit
	James A Thompson	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 June 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed April 2, 2003 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "425" of figure 19 and "21-5a" of figure 22. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 3-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin (US Patent 5,742,703).

Regarding claim 1: Lin discloses a method for processing gray level image data (column 3, lines 1-3 of Lin). Said method comprises subjecting the gray level image data to halftone screen processing to form halftone processed screen image data (column 3, lines 1-20 of Lin).

Said method further comprises analyzing a current pixel of the halftone processed screen image data to a test criterion to determine if the current pixel is a possible saturated color text image (column 7, lines 14-18 and lines 24-27 of Lin). Grayscale values are stored and processed in parallel by two different halftone processors, namely channel A and channel B (column 7, lines 2-9 of Lin). Channel A thresholds the grayscale values (column 7, lines 16-18 of Lin) for data that is saturated or nearly saturated in order to distinguish regions of the image that are text or line art (column 7, lines 24-27 of Lin).

If the current pixel meets the criterion for being a pixel of a possible saturated color text image, the gray level image enhanced processing modification of the current pixel for output to a printer or display is selected (figure 2(80,86,88) and column 8, lines 40-46 of Lin). Buffer 1 (figure 2(80) of Lin) stores the halftoned data from channel A (column 8, lines 21-23 of Lin). The halftoned data from channel A undergoes pattern matching (column 7, lines 47-55 of Lin), which is used so that said halftone data can undergo high-addressability gray-scale or sub-pixel processing (figures 4a-4d; and

column 8, lines 1-6 and lines 10-14 of Lin). If the image data at the point that is being output is tagged as text or line art, then the data from buffer 1 is output (column 8, lines 40-46 of Lin).

If the current pixel does not meet the test criterion for being a pixel of a possible saturated color text image selecting the current pixel gray level value as processed by the halftone screen processing for output to a printer or display (figure 2(80,86,88) and column 8, lines 40-47 of Lin). Buffer 2 (figure 2(86) of Lin) stores the halftoned data from channel B, which is the grayscale image data (column 8, lines 38-40 of Lin). If the image data at the point that is being output is not tagged as text or line art, then the data from buffer 2 is output (column 8, lines 40-47 of Lin).

Regarding claim 3: Lin discloses that in the step of analyzing, the current pixel and plural neighboring pixels to the current pixel are examined relative to a threshold (column 7, lines 20-27; and column 8, lines 10-14 of Lin). Each pixel is examined relative to a threshold value that determines whether or not a pixel is in saturation, and therefore either text or line art (column 7, lines 20-27 of Lin). A pixel with plural neighboring pixels is used in determining if a particular pattern exists for the purpose of determining a higher resolution sub-pixel image signal (figures 4a-4d and column 8, lines 10-14 of Lin).

Regarding claim 4: Lin discloses that the threshold value is a variable that is determined for use in the binarizing block (figure 2(72) of Lin). It is preferred that the threshold value is set to about 95% of the maximum value (column 7, lines 24-26 of Lin). However, this is done for the purpose of making sure that the continuous-tone

portions of the image are not inadvertently mistaken for text or line art (column 7, lines 26-27 of Lin). Since the range of the desired threshold is variable (column 7, lines 25-26 of Lin), the threshold is an input variable to the binarizing block (figure 2(T,72) and column 7, lines 18-21 of Lin), and the quality and characteristics of different images are inherently variable, then the threshold is adjustable.

Regarding claim 5: Lin discloses that one of the screen processors has a screen frequency of at least 200 lines per inch (column 10, lines 36-45 of Lin).

Regarding claim 6: Lin discloses that a current pixel meeting the criterion of being a saturated color text image has its gray level value adjusted to a maximum value (column 7, lines 16-20 and lines 24-27 of Lin). When the current pixel is processed by channel A, the grayscale value of said current pixel is thresholded (column 7, lines 16-20 of Lin). Then, said current pixel saved as a single bit (column 7, lines 28-32 of Lin), which means that it is set to either on or off. Setting said current pixel to either on or off essentially the same as setting an 8-bit grayscale value to either 0 or 255, especially since the single bit value determines whether the entire pixel is either all black or all white. Therefore, if the grayscale value of said current pixel is above the threshold value, then said current pixel is adjusted to the maximum value. The thresholding operation is performed prior to gray level enhancement processing (figure 2(74,78) of Lin). In figure 2 of Lin, the binarization (figure 2(72) of Lin) occurs before the pattern matching (figure 2(78) of Lin). The pattern matching block involves in part the rendering of grayscale or sub-pixel image signals (column 7, lines 38-44 and column 8, lines 1-6 of Lin), which is essentially gray level enhanced processing.

Regarding claim 7: Lin discloses that, in gray level enhanced processing, a substantially binary image file is modified to add gray level pixels of a density less than maximum density (figures 4a-4d and column 8, lines 1-6 of Lin). Channel A binarizes the image (column 7, lines 16-18 of Lin). The binarized data is then processed to create gray-scale or sub-pixel image signals (figures 4a-4d and column 8, lines 1-6 of Lin). Said processing is performed in order to render the image in an acceptable manner (column 8, lines 2-3 of Lin), which means that artifacts such as jaggedness are removed and smooth edge transitions are provided (figures 7 and 8; and column 11, lines 39-43 and lines 52-55 of Lin).

Regarding claim 8: The arguments regarding claim 7 are incorporated herein. Furthermore, the substantially binary image file can be a binary image file since all of the pixels in the image file are binarized by the binarizer (figure 2(72) and column 7, lines 14-18 of Lin).

Regarding claim 9: Lin discloses that a set of color space coordinates can be used for the image data (column 6, lines 12-21 of Lin). Since the invention disclosed by Lin works in terms of single colors (column 6, lines 17-21 of Lin), each color is processed separately. Each color of the image data is binarized by channel A (column 7, lines 16-21 of Lin) and processed as grayscale data by channel B (column 8, lines 24-27 of Lin). Therefore, the image data stored in the buffers is essentially a color separation file since a separate bitmap for each color is stored as part of the overall image data.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 5,742,703) in view of Mongeon (US Patent 5,710,824).

Regarding claim 10: Lin discloses the use of multiple colors in printing (column 6, lines 12-21 of Lin). Lin does not disclose expressly that the image data is adjusted for color saturation according to a personal preference.

Mongeon discloses that the image data is adjusted for color saturation according to a personal preference (column 1, lines 3-7; and column 6, lines 32-37 of Mongeon). The color gamut of image data is adjusted based on the aesthetic appearance of an image (column 1, lines 3-7 of Mongeon), which would inherently relate to personal preference. Adjustment of the color gamut of an image includes the adjustment of the image data based on color saturation (column 6, lines 32-37 of Mongeon).

Lin and Mongeon are combinable because they are from the same field of endeavor, namely the processing of image data for printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to adjust the image data for color saturation according to a personal preference. The motivation for doing so would have been to improve the aesthetic appearance of the image (column 1,

lines 5-7 of Mongeon). Therefore, it would have been obvious to combine Mongeon with Lin to obtain the invention as specified in claim 10.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 5,742,703) in view of Mongeon (US Patent 5,710,824) and Tai (US Patent 5,694,224).

Regarding claim 11: Lin in view of Mongeon discloses that the image data is adjusted for color saturation according to personal preference, as discussed in the arguments regarding claim 10, which are incorporated herein.

Lin in view of Mongeon does not disclose expressly that the image data is analyzed for contrast and in response to analysis for contrast blending coefficients are generated and the image data that is adjusted for color saturation is independently subjected to separate halftone screen processing with screens of different halftone frequencies and outputs of the processing by the different halftone screen processings are each modified by a respective blending coefficients.

Tai discloses that the image data is analyzed for contrast (column 9, lines 12-15 of Tai). In response to analysis for contrast, blending coefficients are generated (column 10, lines 28-34 of Tai). Said image data is independently subjected to separate halftone screen processing (column 8, line 56 to column 9, line 10 of Tai). The screens have different halftone frequencies (column 8; lines 56-57, lines 59-60 and lines 63-64; and column 9, lines 4-5 of Tai). The outputs of the processing by the different halftone

screen processings are each modified by a respective blending coefficients (column 10, lines 26-30 of Tai).

Lin in view of Mongeon is combinable with Tai because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to take the halftone data processed by the halftone processor of Lin (figure 2(84) of Lin) and process said halftone data based on the level of contrast calculated. Then, said halftone data is processed by a plurality of different halftone screens based on said level of contrast and blended before being output. The motivation for doing so would have been to print halftone dots in a manner appropriate to the level of contrast of the data (column 8; lines 58-59, lines 62-63 and lines 65-66; and column 9, lines 9-10 of Tai) and to prevent unnatural appearances in the image (column 8, lines 35-36 of Tai). Therefore, it would have been obvious to combine Tai with Lin in view of Mongeon to obtain the invention as specified in claim 11.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 5,742,703) in view of Yoshiaki (US Patent 5,574,833).

Regarding claim 12: Lin discloses smoothing edges using higher resolution image data (figures 4a-4d and column 8, lines 1-6 of Lin). Lin does not disclose expressly that the resolution enhancement processor is adjustable to provide for different levels of smoothing of edges.

Yoshiaki discloses that the resolution enhancement used for smoothing edges is adjustable (figures 4a-4f and column 3, lines 3-12 of Yoshiaki), thus providing different levels of smoothing of edges (column 3, lines 1-3 of Yoshiaki). The level of enhancement is adjusted based on the resolution of the input image, in this case a fax machine image, and the resolution of the output image, in this case a printer image (column 3, lines 3-12 of Yoshiaki). Therefore, the enhancement can be made by the selection of the fax machine, the selection of the printer, and the selection of the resolution of the printer if said printer can print in more than one resolution.

Lin and Yoshiaki are combinable because they are from the same field of endeavor, namely halftoning and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to make the resolution enhancement adjustable to provide for different levels of smoothing of edges. The motivation for doing so would have been to be able to provide smooth edges when the input data provided is of one resolution and the output data desired is of another resolution (column 4, lines 52-55 of Yoshiaki). Therefore, it would have been obvious to combine Yoshiaki with Lin to obtain the invention as specified in claim 12.

9. Claims 2, 13-15, 17-19 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 5,742,703) in view of Tai (US Patent 5,694,224).

Regarding claim 2: Lin discloses processing gray level image data through a halftone screen (figure 2(84) and column 8, lines 24-27 of Lin). Lin does not disclose

expressly that the gray level image data is processed independently through plural halftone screen processors and the output of the two processors are blended.

Tai discloses that the gray level image data is processed independently through plural halftone screen processors (column 8, line 56 to column 9, line 11 of Tai) and the output of the two processors are blended (column 10, lines 26-30 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to process the gray level image data using plural halftone screen processors and then blending two of said processors. The motivation for doing so would have been to print halftone dots in a manner appropriate to the level of contrast of the data (column 8; lines 58-59, lines 62-63 and lines 65-66; and column 9, lines 9-10 of Tai). Therefore, it would have been obvious to combine Tai with Lin to obtain the invention as specified in claim 2.

Regarding claim 13: Lin discloses a method for processing gray level image data (column 3, lines 1-3 of Lin). Said method comprises comparing the gray level of the halftone screen processed current pixel relative to a threshold criterion (column 7, lines 16-21 and column 8, lines 27-30 of Lin). Channel A stores the data it processes in Buffer 1 (column 8, lines 21-23 of Lin) and Channel B stores the data it processes in Buffer 2 (column 8, lines 38-40 of Lin). If the data in Buffer 1 is indicative of a text or line art region, then said data is output (column 8, lines 44-46 of Lin) after grayscale or sub-pixel enhancement has been performed (column 8, lines 1-6 of Lin). Such an indication requires that the data value is above a relatively high threshold value (column

7, lines 24-27 of Lin) and that a matching pattern is found (column 8, lines 18-20 of Lin). The matching criterion is a further thresholding criterion since it thresholds not just the current pixel, but the surrounding pixels as well to see if the current pixel is in a text or line art region (column 7, lines 40-46 of Lin). If the data in Buffer 1 is not indicative of a text or line art region, then the grayscale data in Buffer 2 is output (column 8, lines 46-47).

Lin further discloses that, if the gray level of the blended halftone screen processed current pixel meets said threshold criterion (column 7, lines 16-18 of Lin), then a gray level image enhanced processing modification of the current pixel (column 8, lines 1-6 of Lin) is provided for output to a printer or display (column 8, lines 42-47 of Lin).

Lin further discloses that, if the gray level of the blended halftone screen processed current pixel does not meet said threshold criterion (column 7, lines 16-18 of Lin), then the current pixel gray level as processed by the halftone screen processing is provided for output to a printer or display (column 8, lines 40-47 of Lin).

Lin does not disclose expressly subjecting first gray level image data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data; analyzing a current pixel of the first gray level image data for contrast index; in response to the analyzing, generating blending coefficients for processing that current pixel; and processing the plural separate halftone screen processed image data with the blending coefficients to blend halftone screen processed

gray level image data of the same current pixel to form a blended halftone screen processed gray level current pixel.

Tai discloses subjecting first gray level image data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data (column 8, line 56 to column 9, line 11 of Tai); analyzing a current pixel of the first gray level image data for contrast index (column 9, lines 12-15 of Tai); in response to the analyzing, generating blending coefficients for processing that current pixel (column 10, lines 28-34 of Tai); and processing the plural separate halftone screen processed image data with the blending coefficients (column 10, lines 26-37 of Tai) to blend halftone screen processed gray level image data of the same current pixel to form a blended halftone screen processed gray level current pixel (column 10, lines 37-39 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to process gray level image data at the halftone processor (figure 2(84) of Lin), as taught by Lin, with plural halftone screens, compute a contrast index for each pixel, generate respective blending coefficients, and then blend the halftone screens accordingly, as taught by Tai. The motivation for doing so would have been that halftone screen blending reduces printing artifacts (column 10, lines 57-63 of Tai). Therefore, it would have been obvious to combine Tai with Lin to obtain the invention as specified in claim 13.

Regarding claim 14: Lin discloses processing gray level image data through a halftone screen (figure 2(84) and column 8, lines 24-27 of Lin). Lin does not disclose expressly that, in the step of determining if the gray level of the blended halftone screen processed current pixel meets the threshold criterion, there are also examined gray levels of blended halftone screen processed neighboring pixels to the current pixel.

Tai discloses that gray levels of blended halftone screen processed neighboring pixels to the current pixel are also examined (column 9, lines 12-19 of Tai) in the step of determining if the gray level of the blended halftone screen processed current pixel meets the threshold criterion (column 9, lines 39-45 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to examine the neighboring pixels of the current pixel being examined in the step of determining if the gray level of the blended halftone screen processed current pixel meets the threshold criterion. The motivation for doing so would have been to determine which halftone screens are to be blended (column 9, lines 39-45 of Tai). Therefore, it would have been obvious to combine Tai with Lin to obtain the invention as specified in claim 14.

Regarding claim 15: The arguments regarding claim 4 are incorporated herein.

Regarding claim 17: Lin discloses that the current pixel meeting the threshold criterion has its gray level value adjusted to a maximum value before being processed by gray level enhanced processing (column 7, lines 16-20 and lines 24-27 of Lin). When the current pixel is processed by channel A, the grayscale value of said current

pixel is thresholded (column 7, lines 16-20 of Lin). Then, said current pixel saved as a single bit (column 7, lines 28-32 of Lin), which means that it is set to either on or off. Setting said current pixel to either on or off essentially the same as setting an 8-bit grayscale value to either 0 or 255, especially since the single bit value determines whether the entire pixel is either all black or all white. Therefore, if the grayscale value of said current pixel is above the threshold value, then said current pixel is adjusted to the maximum value. The thresholding operation is performed prior to gray level enhancement processing (figure 2(74,78) of Lin). In figure 2 of Lin, the binarization (figure 2(72) of Lin) occurs before the pattern matching (figure 2(78) of Lin). The pattern matching block involves in part the rendering of grayscale or sub-pixel image signals, which is essentially gray level enhanced processing (column 7, lines 38-44 and column 8, lines 1-6 of Lin).

Regarding claim 18: The arguments regarding claim 5 are incorporated herein.

Regarding claim 19: The arguments regarding claim 8 are incorporated herein. A binary image is inherently a substantially binary image.

Regarding claim 21: Lin discloses a method for processing gray level image data (column 3, lines 1-3 of Lin). Said method comprises halftone screening of the input grayscale image data (column 8, lines 24-27 of Lin). Lin further discloses that, if the halftone screen processed gray level value current pixel is substantially a maximum density pixel or is adjusted to be a substantially maximum density pixel (column 7, lines 24-27 of Lin), then said pixel is subjected to a gray level image enhanced processing modification (figures 4a-4d; column 8, lines 1-6 of Lin) to reduce jaggedness in an

image (column 11, lines 43-55 of Lin). If the grayscale value of a pixel is above a threshold value, preferably about 95% of maximum, then said pixel is binarized as fully black (column 7, lines 24-29 of Lin), thus setting said pixel to the maximum value. If said pixel is set to the maximum value, then said pixel is modified as a grayscale or sub-pixel image (column 8, lines 1-6 of Lin). Said pixel is thus adjusted for the purpose of smoothing jagged edges (column 11, lines 43-55 of Lin).

Lin does not disclose expressly subjecting first gray level image data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data; and blending halftone screen processed gray level image data of the same current pixel to form a blended halftone screen processed gray level value current pixel.

Tai discloses subjecting first gray level image data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data (column 8, line 56 to column 9, line 11 of Tai). Tai further discloses blending halftone screen processed gray level image data of the same current pixel (column 10, lines 28-34 of Tai) to form a blended halftone screen processed gray level value current pixel (column 10, lines 34-39 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use plural separate halftone screens to halftone process the grayscale pixels of the image and then blend the results of the plural halftone screens to obtain the resultant blended grayscale pixels. The

motivation for doing so would have been to be able to process an image with multiple types of image regions (column 10, lines 57-60 of Tai). Therefore, it would have been obvious to combine Tai with Lin to obtain the invention as specified in claim 21.

Regarding claim 22: Lin discloses plural halftone screen processings (figure 2(72,84) and column 7, lines 14-16 of Lin). Lin does not disclose expressly that said plural halftone screen processings include a halftone screen processing employing a partial dot growth pattern and a halftone screen processing employing a mix dot growth pattern.

Tai discloses a halftone screen processing employing a partial dot growth pattern and a halftone screen processing employing a mix dot growth pattern (column 4, lines 64-68 and column 6, lines 31-39 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a partial dot growth pattern for one of the halftone screens and a mixed dot growth pattern for the other halftone screen. The motivation for doing so would have been to take advantage of the different tonal characteristics and texture patterns of the partial and the mixed dot growth patterns (column 6, lines 33-34 of Tai). Therefore, it would have been obvious to combine Tai with Lin to obtain the invention as specified in claim 22.

Regarding claim 23: Lin discloses processing gray level image data through a halftone screen (figure 2(84) and column 8, lines 24-27 of Lin). Lin does not disclose expressly that the plural separate halftone screen processings comprise a halftone

screen processing suitable for a text type image and a halftone screen processing suitable for a pictorial image.

Tai discloses that the plural separate halftone screen processings comprise a halftone screen processing suitable for a text type image (column 10, lines 60-63 of Tai) and a halftone screen processing suitable for a pictorial image (column 10, lines 64-67 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a halftone screen that is suitable for text and a halftone screen that is suitable for a pictorial image. The motivation for doing so would have been to be able to process an image with multiple types of image regions (column 10, lines 57-60 of Tai). Therefore, it would have been obvious to combine Tai with Lin to obtain the invention as specified in claim 23.

Regarding claim 24: Lin discloses processing gray level image data through a halftone screen (figure 2(84) and column 8, lines 24-27 of Lin). Lin does not disclose expressly that the plural halftone screen processed gray level image data is blended according to blending coefficients.

Tai discloses that the plural halftone screen processed gray level image data is blended according to blending coefficients (column 10, lines 28-37 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to blend the plural halftone

screens according to blending coefficients. The motivation for doing so would have been to be able to render image regions where the contrast index is between the values given for the existing halftone screens (column 9, lines 39-45 of Tai). Therefore, it would have been obvious to combine Tai with Lin to obtain the invention as specified in claim 24.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 5,742,703) in view of Tai (US Patent 5,694,224) and Mongeon (US Patent 5,710,824).

Regarding claim 16: Lin discloses processing gray level image data through a halftone screen (figure 2(84) and column 8, lines 24-27 of Lin). Lin does not disclose expressly that the first gray level image data is color separation image data and that, prior to subjecting the first gray level image data to plural separate halftone screen processing, the gray level image data is subject to processing for gray component replacement and undercolor removal.

Tai discloses that the first gray level image data is color separation image data (column 7, lines 57-60 of Tai). Tai further discloses subjecting the first gray level image data to plural separate halftone screen processing (column 8, line 56 to column 9, line 11 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use color separation image

data. The motivation for doing so would have been to properly render color images (column 7, lines 59-60 of Tai). Furthermore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to subject the first gray level image data to plural separate halftone screen processing. The motivation for doing so would have been to print halftone dots in a manner appropriate to the level of contrast of the data (column 8; lines 58-59, lines 62-63 and lines 65-66; and column 9, lines 9-10 of Tai). Therefore, it would have been obvious to combine Tai with Lin.

Lin in view of Tai does not disclose expressly that the gray level image data is subject to processing for gray component replacement and undercolor removal.

Mongeon discloses subjecting color separation image data to processing for gray component replacement, referred to in Mongeon as "gray balance" and undercolor removal (column 2, lines 10-14 of Mongeon) prior to outputting to a device (figure 1(20→30); and column 1, line 66 to column 2, line 9 of Mongeon).

Lin in view of Tai is combinable with Mongeon are combinable because they are from the same field of endeavor, namely the processing of image data for printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to perform gray component replacement and undercolor removal on the image data prior to plural halftone screen processing. The motivation for doing so would have been to adjust the color space so that the colors are calibrated for the desired output device (column 2, lines 1-9 of Mongeon). Therefore, it would have been obvious to combine Mongeon with Lin to obtain the invention as specified in claim 16.

11. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 5,742,703) in view of Tai (US Patent 5,694,224) and in further view of *In re Dulberg* (289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961)).

Regarding claim 20: Lin discloses an apparatus for processing gray level image data (figure 2 of Lin). Said apparatus comprises an input (figure 2(70) of Lin) to two image data processing devices (figure 2(72,84) of Lin) to input image data representing a current gray level pixel (column 7, lines 14-16 of Lin). One of said image data processing devices (figure 2(84) of Lin) is a halftone screen processing device (column 8, lines 25-27 of Lin).

Said apparatus further comprises a detector (figure 2(78) of Lin) for examining the current pixel after image processing operations and neighboring pixels thereof after image processing operations (column 7, lines 40-46 of Lin) and determining if the current pixel and such neighboring pixels represent a substantially binary image file (column 7, lines 24-27 and lines 32-37 of Lin) and generating a signal (tag) relative to such determination (column 8, lines 18-20 of Lin).

Said apparatus further comprises a selector (figure 2(88) of Lin), responsive to the signal (tag), that selects either the gray level image enhancement processing device output or a bypass representing a halftone data output (column 8, lines 42-47 of Lin).

Lin does not disclose expressly that the two image data processing devices (figure 2(78,84) of Lin) are first and second halftone screen processing devices that form plural separate halftone processed screen gray level image data. Furthermore, Lin does not disclose expressly a device for analyzing the current pixel for contrast index; a

device responsive to the contrast index for generating blending coefficients; a blending operation processor that generates a blended halftone data output for the current pixel; an input at the blending operation processor for inputting respective outputs of the first and second halftone screen processing devices and the blending coefficients; and a gray level image enhancement processing device connected to the output of the blending operation processor.

Tai discloses first (figure 10a of Tai) and second halftone screens (figure 11 of Tai) that form plural separate halftone processed screen gray level image data (column 8, lines 56-63 of Tai). Tai further a device (figure 6(150) and column 7, lines 42-43 of Tai) for analyzing a current pixel for contrast index (column 9, lines 12-19 of Tai) and that is responsive to the contrast index for generating blending coefficients (column 10, lines 28-37 of Tai). The blending screen logic control device (figure 6(150) of Tai) analyzes each pixel and a corresponding neighborhood for contrast (column 9, lines 12-19 of Tai) and calculates a contrast index (column 9, lines 39-45 of Tai). Said blending screen logic control further generates blending coefficients based on said contrast index (column 10, lines 28-37 of Tai).

Tai further discloses a blending operation processor (figure 6(160) of Tai), referred to as a "unified rendering device" in Tai, that generates a blended halftone data output for the current pixel (column 7, lines 37-40 and lines 61-67 of Tai).

Tai further discloses an input (figure 6(150→160) of Tai) at said blending operation processor for inputting respective outputs of the first and second halftone screens and the blending coefficients. As can be seen from figure 6 of Tai, the outputs

of the blending screen logic control (figure 6(150) of Tai) are input to the unified rendering device (figure 6(160) of Tai). The outputs relating to the first and second halftone screens and blending coefficients are input to said unified rendering device for rendering and outputting (column 7, lines 37-40 of Tai).

Tai further discloses a gray level image enhancement processing device (figure 18(340) of Tai). The gray scale image mapper and tone adjustment device (figure 18(340) of Tai) enhances the gray level image data so that said image data can be tone adjusted (column 14, lines 23-31 of Tai) and displayed using a higher number of bits (column 14, lines 17-23 of Tai).

Lin and Tai are combinable because they are from the same field of endeavor, namely halftone printing and image processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a first halftone screen processing device in place of the binarizer (figure 2(72) of Lin) and a second halftone screen for the halftone screen processing device (figure 2(84) of Lin); include the blending screen logic control device (figure 6(150) of Tai), as taught by Tai, after the halftone screen processing devices, as taught by Lin; include the unified rendering device (figure 6(160) of Tai) that generates a blended halftone data output, as taught by Tai, after said blending screen logic control; and include an input (figure 6(150→160) of Tai) for inputting the outputs of the first and second halftone screen processing devices and the blending coefficients into said unified rendering device. The motivation for doing so would have been to be able to process an image with multiple types of image regions (column 10, lines 57-60 of Tai). Furthermore, it would have been obvious to a

person of ordinary skill in the art at the time of the invention to include a gray level enhancement processing device (figure 18(340) of Tai), as taught by Tai, connected to the output of said unified rendering device. The motivation for doing so would have been to adjust the image data so that the proper tone is displayed and for the proper bit-depth (column 14, lines 14-17 of Tai). Therefore, it would have been obvious to combine Tai with Lin.

Lin in view of Tai does not disclose expressly that the device for analyzing the current pixel for contrast index and the device responsive to the contrast index are separate devices. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to split the blending screen logic control device (figure 6(150) of Tai) into the two separate aforementioned devices and perform the functions of said blending screen logic control device as two separate devices since *In re Dulberg* has held that making elements separable is an obvious design choice if there is no unexpected result occurring from the separation that distinguishes over the prior art.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Goodwin et al., US Patent 5,818,975, October 6, 1998.

Kasahara et al., US Patent 5,926,577, July 20, 1999.

Carlsen et al., US Patent 6,020,897, February 1, 2000.

Noriyuki Okisu, US Patent 6,091,862, July 18, 2000.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A Thompson whose telephone number is 703-305-6329. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703-308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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James A. Thompson
Examiner
Art Unit 2624

JAT
February 12, 2004

David K Moore

DAVID MOORE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600